THE ROYAL OBSERVATORY, GREENWICH.

THE annual visitation by the Board of Visitors of the Royal Observatory, Greenwich, was held on Saturday last, June 5, when, in accordance with the usual custom, the Astronomer Royal presented his annual report showing the work performed during the twelve months ended May 10.

The transit and circle observations, 10,142 and 10,034 respectively, included the sun, moon, planets, and fundamental stars, and observations of stars brighter than magnitude 9·0 in the zone 24° to 32° N. for the Oxford astrographic work. From the observations made in 1907, the value of the co-latitude, using Pulkowa refractions, was found to be 38° 31′ 21·71″.

From the solar observations of 1907, the tabular value for the obliquity of the ecliptic requires a correction of −0·01″, whilst the discordance between summer solstice and winter solstice observations, +0·20″, indicates that the mean of the observed distances from the pole to the ecliptic is apparently too small by 0·10″. The 1908 values of the diurnal changes of level and nadir are sensibly smaller than the mean values for the period 1897–1905.

The mean error of the moon's tabular place, deduced from ninety-six observations made during 1907, is −0·3875. in R.A. and −0·37″ in N.P.D., while from 105 observations the mean error in R.A., for 1908, is −0·4178.

The Second Nine-year Catalogue (1900), completed in 1905, will shortly be ready for distribution.

The altazimuth was employed as in previous years, and a comparison of the results from the two instruments, altazimuth and transit circle, shows that the lunar observations agree very satisfactorily.

A ten-year catalogue of the stars observed with the altazimuth in the meridian, during the period 1899–1908, is to be prepared, and will contain about 1500 stars of the following classes:—(1) stars in Newcomb's Fundamental Catalogue; (2) stars used for the heliometer observations of the major planets at the Cape; (3) Eros reference stars, 1900–1; (4) moon culminators and other selected stars; the star-places will be reduced to the equinox of 1900·0.

With the reflex zenith tube 1040 double and seventeen single observations were obtained during the year, eighty-eight different stars being observed. An arrangement for controlling the field illumination of this instrument by tilting the annular reflector proved unsatisfactory, and the variation of brightness is now controlled by a rheostat.

With the 28-inch refractor, observations of double stars were made from a working catalogue including all known double stars showing relative motion, Hough stars not previously observed at Greenwich, and a number of pairs, having separations of less than 2″, selected from Hussey's and Aitken's catalogues; among the stars observed were κ Pegasi, δ Equulei, 70 Ophiuchi, and Procyon. Bifilar and double-image micrometer measures of the polar and equatorial diameters of Jupiter were also made with the 28-inch refractor, some measures being made by Mr. Bowyer, before sunset, to ascertain the effects of irradiation. The new dusky ring of Saturn, discovered at the Geneva Observatory, was examined on thirteen nights.

Nearly 300 photographs were taken with the 30-inch reflector, including 23 of Phœbe, 20, 8, and 15 of J VI., J VII., and J VIII. respectively, 32 of comet 1908*c* for position, and 139, on thirty-seven nights, for the study of the rapid changes in its tail and form. Twenty long exposures were made in the search for Halley's comet, but without success. Whilst comet 1908*c* was under observation it was found that the sensitiveness of the plates was lowered by the absorption of moisture during the exposures, and the difficulty was overcome by placing an electric heater, designed by Mr. Davidson, in the plate-holder behind the plate.

In astrographic work, the photographic division made about 12,000 prints, reproducing, on double scale, 202 plates. Only 125 plates now remain to be reproduced ere the Greenwich contribution of 1149 plates is complete, and it is hoped that the work will be completed this year.

A re-computation of the perturbations of Halley's comet, by Pontécoulant's method, gave April 13, instead of April 8, 1910, as the probable date of perihelion passage, whilst the method of mechanical quadratures gave April 16; the identifications of the comet have now been carried back to 240 B.C., beyond which date no satisfactory records exist.

The observed magnetic elements for 1908 were:—

Mean declination	15° 53·5′ W.
Mean horizontal force	4·0184 (in British units) 1·8528 (in metric units)
Mean dip (with 3-in. needles) ...	66° 56′ 17″

and there were two days of great, and six of lesser, magnetic disturbance.

In the testing division both chronometers and chronometer watches showed an improvement in their performances over those of the previous year.

The time-signal report shows satisfactory performance, but the signals from January 1 to January 7 were to some extent erroneous, being affected by an uncertain error of the Greenwich clock.

In concluding his report, Sir William Christie outlines the growth of the observatory's work since 1836. For many years, it is stated, the work of the observatory has been seriously hampered by the inadequacy of the permanent staff.

THE ASSOCIATION OF TEACHERS IN TECHNICAL INSTITUTIONS.

THE third annual conference of the Association of Teachers in Technical Institutions, held at Liverpool during Whitsuntide, was highly successful. On the morning of Monday, May 31, after addresses of welcome from representatives of the Liverpool Education Committee, the president, Mr. J. Wilson, delivered the presidential address. In the course of the address he stated that one of the objects of the association was to further the progress of technical education by breaking down the barriers separating technical institution teachers from those engaged in primary, secondary, and university work.

After discussing certain matters of professional interest, such as the proposed minimum scale of salaries, the conditions of service of part-time teachers, superannuation of teachers, and the representation of technical institution teachers upon such bodies as local education committees, the consultative committee of the Board of Education, and the proposed Teachers' Registration Council, Mr. Wilson said members may congratulate themselves that, upon the whole, an increasing amount of attention is being directed to technical education. Employers are recognising its value more and more, and sociologists of all phases of political thought are increasingly insisting upon the vital importance of technical education to the community. The higher ranks in the commercial world recognise more clearly than their predecessors the necessity for technical education. The main obstacle lies in the opposition of the foremen, the Trades Unions, and the apathy of the workers themselves during the critical period from fourteen to twenty-one years of age.

The work done inside the technical institutions has been characterised of recent years by a steady improvement, both in quantity and quality. The calibre of the students is slowly rising, and systematic courses extending over a period of years are being taken by many students, instead of isolated subjects as in the past. The character of the staff, equipment, and courses of instruction (both day and evening) in some of the technical schools places them now on an equal educational level with many university colleges.

After discussing the educational reforms recommended in the Majority and Minority Reports of the Poor Law Commission, Mr. Wilson pointed out that, partly as a result of the Act of 1902, the country is now covered with a network of more or less efficient secondary schools, generally of one type, that is, the old-fashioned "grammar-school" type. We need two distinct groups of secondary schools, one preparing for the universities or the learned professions, and the other preparing the boys (and girls) for commerce, scientific and technical industries, trades and crafts, while continuing the general education of the

pupils. Attention was directed to the necessity of developing day courses of instruction in technical schools or polytechnics, of which there should be one in each large town or centre of population. These day courses should be of a high standing, and should be restricted to students of at least sixteen years of age.

One possible reform of great urgency is the improvement in the organisation, curricula, and methods of the evening continuation school, which should link on with the evening technical school. At present, evening continuation schools, save in a few towns, are profoundly unsatisfactory. It was suggested that the time is now ripe for the appointment of a Royal (or Departmental) Commission to deal with the general question of the organisation and coordination of technical education and its relationship to primary and secondary education. With respect to the Imperial College of Technology, it was stated that if the desires of its founders and the needs of the country are to be satisfied, this institution should not undertake work of a diploma or degree standard, but it should restrict itself to post-graduate work, technical research, and such branches of higher technological teaching which are not provided for at present. A danger facing technical education at the present moment is the tendency in some quarters to close the higher classes in pure science in technical institutions, partly through motives of economy and partly through efforts towards an illusory coordination with university college work.

Mr. Wilson then discussed the "culture" value of technical education, maintaining that a broad scientific, technical, or artistic training affords a highly valuable mental discipline, and is truly educational in the strictest sense of the term. The technical schools of this country must be judged, not only by their purely economic results, but by their gradual leavening effect upon the mental inertia and intellectual sluggishness of the nation. Passing on to certain aspects of the work inside the institutions, doubts were expressed as to the value of the elaborate system of scientific and technical examinations now held by the Board of Education and the City and Guilds Institute. In concluding, Mr. Wilson dealt with the subject of "research" in technical institutions. At present the teaching staff of these institutions, although keenly anxious to engage in research, partly for its own sake and partly from motives of professional advancement, is generally unable, save in isolated cases, to do so. The stress of institution work, including, say, ten to fifteen lectures per week, with another ten to fifteen hours' laboratory work, to which is added departmental work, correction of notes and exercises, and preparation of lectures, is so great that "research" under the present conditions is generally impossible.

In the afternoon of May 31 a valuable paper was read by Mr. A. Galbraith (Glasgow and West of Scotland Technical College) detailing the successful efforts recently made in the Glasgow district to coordinate the work of thirty-seven local evening continuation schools with that of the Glasgow Technical College, resulting in approximately five hundred fully qualified evening students, who have successfully passed through a preliminary scientific two years' course in these schools, being annually passed on to the technical college. In the evening the annual dinner of the association was held, the chief guests being the Lord Mayor and the Lady Mayoress of Liverpool, and representatives of educational organisations and institutions, as the National Union of Teachers, the Liverpool University, and local education authorities.

The morning session of June 1, devoted to professional matters such as the salary scale, conditions of service of part-time teachers, superannuation scheme, and legal matters, was opened by the Lord Mayor of Liverpool (the Right Hon. H. Chalenor Dowdall), who in the afternoon gave a reception in the Town Hall to the delegates and members of the association. At night a public meeting was held, when addresses on various phases of technical education were delivered by Mr. Max Muspratt and other prominent local educationists.

The following resolutions on general educational matters were passed during the conference:—

(1) The preliminary training which students receive at present before entering technical institutions is not such as to fit them for benefiting by the instruction provided. To improve this, the following reforms are desirable:—

(*a*) No child should be allowed to leave school before the age of fifteen, and the half-time system should be abolished.

(*b*) In the education of children attending elementary schools special attention should be paid to the teaching of practical arithmetic, elementary science, and to manual training.

(2) *Resolutions concerning the present evening continuation schools*:—

(*a*) The evening continuation schools should be affiliated to the higher institutions in their respective districts.

(*b*) The curricula of the evening continuation schools should be arranged in conjunction with the authorities of the higher institutions, who should have the right of entry or inspection.

(3) Admission to technical schools should, in general, be conditional on the student having reached a standard of education to be subsequently fixed.

(4) (*a*) The work of the secondary schools should be divided into three branches, viz. (i.) technical-secondary schools (including trade schools); (ii.) commercial secondary; (iii.) classical-secondary.

(*b*) There should be a properly graded system of scholarships, with maintenance, available at these schools.

(5) This association heartily approves of the general principles embodied in the following recommendations of the Minority Report of the Poor Law Commissioners:—

It should be illegal to employ boys below the age of fifteen or any youth below eighteen for more than thirty hours per week, and boys should be compelled to attend some suitable public institute giving physical and technical training for not less than thirty hours per week at periods to suit the convenience of employers in different industries.

The main points emphasised during the discussions at the conference were the following:—

(1) The pressing need for coordination of technical education with primary and secondary education, especially the linking on of the technical school to the elementary school through the evening continuation school.

(2) The need for the provision of technical-secondary schools in which, while continuing the general education of the pupils in English, a modern language, and science, the curricula shall be such as to afford a suitable training for those who at the end of their secondary-school period will pass on direct to the day technical institution or enter upon industrial or commercial work.

(3) The necessity for the development of higher day technological training, coupled with a generous provision of scholarships with maintenance grants.

ECONOMIC ZOOLOGY.

THE black-currant mite (*Eriophyes ribis*) is a pest only too well known to fruit-growers at the present time, and also one which seems to be rapidly increasing and spreading. Anything that will check its ravages is therefore of great importance, and it is satisfactory to learn that two new parasites of this mite have been discovered and their life-histories described by Miss A. M. Taylor in the April issue of the *Journal of Economic Biology*. The first of these is a minute fungus of the genus Botrytis, near akin to the one which attacks silkworms. This fungus, which is deadly in its action on the mites, makes its appearance when the currant-buds begin to swell abnormally owing to the presence of the mites. Spores of the fungus become blown on such mites as are exposed by the bursting of the buds, and under suitable conditions rapidly develop on their new hosts. Neighbouring mites are speedily infected, and the disease spreads until the tiny parasite has worked completely through the bud destroying not only the mites and their eggs, but the grub by which they are accompanied.

These grubs are the larvæ of a minute fly of the family Chalcididæ, and they, too, depend for their existence upon the mites, although the number they consume is comparatively insignificant in comparison with the swarms which exist in "big-bud." It is manifest, therefore, that the hope of parasitic infection proving efficacious in the case of the currant-mite must rest with the fungus.